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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/648,049	08/26/2003	Steven D. Gray	NC17542DIV (9019.127)	3224

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EXAMINER	
FERGUSON, KEITH	
ART UNIT	**PAPER NUMBER**
2683	

DATE MAILED: 10/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/648,049	Applicant(s) GRAY, STEVEN D.	
	Examiner Keith T. Ferguson	Art Unit 2683	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 26 August 2003.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-39 is/are pending in the application.

4a) Of the above claim(s) 1-19 and 38 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 20-37 and 39 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: See Continuation Sheet.

Continuation of Attachment(s) 6). Other: Divisional Application 60/217,145 of prior art Cervello et al. U.S. 2002/0060995. See sections 2.3 through section 2.4.

DETAILED ACTION

Claim Objections

1. Claim 38 is objected to because of the following informalities: Claim 38 depends on a cancel claim 13. Appropriate correction is required.

Double Patenting

2. Claims 21-37 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-18 of U.S. Patent No. 6,675,012. Although the conflicting claims are not identical, they are not patentably distinct from each other because, for example, claim 21 in the continuation is identical to claim 1 of the patent, except that the limitation "a wireless local area network" is recited.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the

United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claim 39 is rejected under 35 U.S.C. 102(e) as being anticipated by Cervello et al..

The claimed invention reads on Cervello et al. as follows: Cervello et al. discloses in a communication station (StA 1-4) operable pursuant to an IEEE (Institute of Electrical and Electronics Engineers) 802.11 standard within a frequency band (2.4 Ghz) also used by another communication system (basic service set)(BSS 1 and 2) (fig. 1a and paragraphs 0022, 0023), an improvement of measurement summary (channel condition) apparatus at the communication station (paragraph 0034 and 0035) comprising: a selected field populator (received signal strength or RSSI) for populating a selected field of a measurement summary (channel condition) with an indication of whether a portion of the frequency band to which the communication station is tuned is being used to communicate an 802.11-standard-formatted data packet (paragraph 0036).

5. Claim 39 is rejected under 35 U.S.C. 102(e) as being anticipated by Panasik et al..

The claimed invention reads on Panasik et al. as follows: Regarding claim 39, Panasik et al. discloses in a communication station operable in a wireless local area network that

operates pursuant to an IEEE (Institute of Electrical and Electronics Engineers) 802.11 standard within a frequency band also used by another communication system, an improvement of measurement summary apparatus at the communication station (col. 12 line 8 through col. 13 line 5), said measurement summary apparatus comprising: a selected field populator (fig. 2 steps 30-36) for populating a selected field of a measurement summary with an indication of whether a portion of the frequency band to which the communication station is tuned is being used to communicate an 802.11-standard-formatted data packet (col. 12 line 36 through col. 13 line 5).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Panasik et al. in view of Raissinia et al..

Regarding claim 20, Panasik et al. discloses a method (fig.

2) for changing the channel assignment in a wireless LAN system using a clear channel assignment mechanism for randomly accessing a channel (fig. 2 and col. 12 lines 8 through col. 13 line 5), said method comprising the steps of: tuning to the desired frequency (col. 12 lines 36-43); performing a Clear Channel Assessment test (col. 12 lines 43-65);determining a beacon decidability based upon RSSI (col. 12 line 54 through col. 13 line 5). Panasik et al. differs from claim 20 of the present invention in that it does not disclose reporting a physical layer and a media access control to an access point. Raissinia et al. teaches a subscriber unit that transmits a physical layer and a media access control to a central access point (col. 7 lines 10-19). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Panasik et al. with reporting a physical layer and a media access control to an access point in order for the network transceiver to inform the network of packet collision from the received channels scanned thereby reducing interference when frequency hopping in a new network, as taught by Raissinia et al..

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith T. Ferguson whose telephone number is (571) 272-7865. The examiner can normally be reached on 6:30am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Trost can be reached on (571) 272-7872. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Keith Ferguson
Art Unit 2683
October 11, 2005

KEITH FERGUSON
PRIMARY EXAMINER

701524
GR

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DISCLOSURE OF INVENTION

THIS DESCRIPTION SHOULD BE SUPPLEMENTED BY ATTACHING COPIES OF RELEVANT DOCUMENTS, SUCH AS PUBLISHED ARTICLES OR PATENTS, PRODUCT BROCHURES, ENGINEERING NOTEBOOK PAGES AND DRAWINGS.

DESCRIPTIVE TITLE OF THE INVENTION:

Dynamic Channel Selection Scheme for IEEE 802.11 WLANs

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2. PRIMARY CONTACT
If more than one inventor is named above, who will have the primary responsibilities for communicating with Philips Intellectual Property Department with respect to technical information about the invention and usage of the invention?

Inventor Name: Sunghyun Choi

3. PRESENT STAGE OF THE INVENTION

☒ Idea ☒ Research ☐ Development ☐ Manufacture

4. GOVERNMENT CONTRACT INVENTION

Was the invention made under a government contract? ☐ Yes ☒ No

5. PRESENT STATE OF THE ART

Briefly describe the closest already-known technology that relates to the invention. This would include, for example, already existing products, methods or compositions which are known to you personally or through descriptions in publications.

IEEE 802.11, ETSI BRAN HIPERLAN Type 2

(ADD LINES AS NECESSARY, IF COMPLETING ON COMPUTER, OR ATTACH ADDITIONAL PAGES)

6. ADVANCEMENT IN STATE OF THE ART

Briefly describe the unique advancement achieved by the invention. This may be done, for example, by describing a problem with the prior art that is solved or specific objects that are achieved by the invention.

The invention is a new mechanism of dynamic channel selection (DCS) for IEEE 802.11 WLAN. By having the DCS function implemented, an Access Point (AP) can determine the best channel to work at, and initiate the switch of all the stations (STAs) associated with its basic service set (BSS) to the selected channel. While some relevant algorithms, such as when to initiate the switch, will require further research/development, the invention defines the mechanism for the DCS, such as how to communicate between the AP and STAs for a channel switch, without requiring the modification of the existing physical (PHY) layer specifications of IEEE 802.11.

(ADD LINES AS NECESSARY, IF COMPLETING ON COMPUTER, OR ATTACH ADDITIONAL PAGES)

HOW ACHIEVED

Briefly describe the invention and how it achieves the advancement described in paragraph 6.

Please see attached.

(ADD LINES AS NECESSARY, IF COMPLETING ON COMPUTER, OR ATTACH ADDITIONAL PAGES)

8. DISCLOSURE OUTSIDE OF PHILIPS

If the invention has been or will be disclosed to anyone other than a Philips' employee, describe to whom (person / company), when and where.

Will be disclosed to IEEE 802.11 participants in the July meeting of IEEE 802 (in the week of July 8th) held in La Jolla, CA after being filed provisionally.

9. INVENTOR #1: ______________________________

Signature Date

INVENTOR #2: ______________________________
Signature Date

INVENTOR #3: ______________________________
Signature Date

INVENTOR #4: ______________________________
Signature Date

IEEE P802.11
Wireless LANs

Dynamic Channel Selection (DCS) Scheme for 802.11

Date: July 6, 2000

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Abstract

We propose a new mechanism of dynamic channel selection (DCS) for IEEE 802.11 WLAN. By having the DCS function implemented, an Access Point (AP) can determine the best channel to work at, and initiate the switch of all the stations (STAs) associated with its basic service set (BSS) to the selected channel. While some relevant algorithms, such as when to initiate the switch, should remain as implementation-dependent, the standard specification should define the mechanism for the DCS, such as how to communicate between the AP and STAs for a channel switch. One important feature of this DCS mechanism is that it does not require any modification of the existing PHY specifications of 802.11.

1 Introduction

The available number of non-overlapping or orthogonal channels for IEEE 802.11 WLAN systems depends on the underlying PHY. For example, 802.11b PHY has three orthogonal channels at 2.4 GHz, and 802.11a PHY has up to 12 channels at 5 GHz. If two co-located Basic Service Sets (BSSs) operate at the same channel, which are referred to as overlapping BSSs, it is not easy to support Quality-of-Service (QoS) due to the possible contentions among overlapping BSSs. Inside IEEE 802.11 TGe, mechanisms to handle the situations of overlapping BSSs are under discussion, e.g., [3]. However, the best thing one can do is to avoid such a BSS overlapping situation.

In the office environment, this may be achieved by planning the channel allocations to BSSs carefully before the WLAN deployment. However, this is not always possible, especially, in the home environment where other WLAN devices are up and running independently in vicinity, e.g., in the neighboring houses/apartments. Therefore, we need a dynamic channel selection (DCS) scheme, which is not defined in 802.11 currently. With this scheme, the AP of a BSS will determine which channel is with the least interference for all the stations (STAs) associated with its BSS, and will lead all the STAs in the BSS to that selected channel.

A European WLAN standard, ETSI BRAN HIPERLAN Type 2 (H/2), has such a mechanism defined in its technical specification as part of Radio Link Control (RLC) sublayer, which is part of Data Link Control (DLC) Layer [5]. According to European Radiocommunication Committee, HIPERLAN equipment must be capable of avoiding occupied channels by employing a Dynamic Frequency Selection (DFS) mechanism and ensuring a uniform spreading of the devices over all the available channels for HIPERLANs [7]. Note that we use the term "Dynamic Channel Selection" instead of "Dynamic Frequency Selection" used in H/2 since for such a PHY as Frequency Hopping (FH) of 802.11, the concept of frequency selection is not really relevant. While the possibility for IEEE 802.11 WLAN to be allowed into Europe at 5 GHz is under discussion, the function of DCS is highly desired to be added to IEEE 802.11 WLAN.

In fact, there is another requirement of HIPERLANs related to this DCS, which is Tranmission Power Control (TPC) [7]. While we expect some discussions on TPC for 802.11 inside 802.11 Working Group (WG) as well, we will not consider the TPC in this paper. We also confine ourselves into the infrastructure-based 802.11 WLANs with an AP as a centralized decision maker of the DCS within a BSS. That is, we will not consider the ad hoc mode of WLANs in this paper while the DCS mechanism in the ad hoc mode may be also desirable.

While we believe that such relevant algorithms as when to initiate a channel switch should remain as implementation-dependent, the standard specification should define the mechanism for the DCS. In this paper, we propose a possible basic mechanism of DCS for 802.11 with some minor modification of the current 802.11 specifications excluding the underlying PHY specifications.

2 Proposed DCS Mechanism

The proposed DCS mechanism for 802.11 is composed of the following seven components:

- Initiation of a channel selection
- Request of a channel measurement by AP
- Channel measurement process
- Measurement report from STAs
- Decision making by AP
- Channel switch announcement by AP
- Switch into the new channel

In the following, we discuss each component in detail.

2.1 Initiation of Channel Selection

There are two cases when a channel selection can be initiated: (1) when a BSS is formed by an AP; and (2) when the AP and/or a STA of a BSS experience the bad channel condition persistently. For the second case, when to initiate a channel selection is not to be defined in the standard, but implementation-dependent. However, we will need to define some feedback mechanism from the STAs to the AP so that the STAs can report the channel status, which they experience, to the AP. That is, it is possible that a subset of the STAs of a BSS, excluding the AP, may be in an overlapping region with a neighboring BSS, thus experiencing a lot of contentions from the STAs in the neighboring BSS. Moreover, the feedback mechanism may incorporate a channel selection request by a STA, which experience a really bad channel condition. The AP will utilize the channel status information or channel selection request from STAs in order to determine when to begin a channel selection. For the feedback mechanism, we need to define specific management frames. We expect another kind of feedback mechanism for the solution to the overlapping BSSs [4], so the same set of new management frames for the feedback may be used for both purposes.

2.2 Request of Channel Measurements

In order to select the best channel to run a BSS, the AP need to know the status of other channels as well as the current channel. While the status of the current channel should be available to the AP in order to initiate a channel selection, the AP need to collect the information about other channels. This will be done via the channel measurements of other STAs. While the channel measurement by the AP itself may be possible by disrupting the service of a BSS for a short time, we believe that it is not desirable since the AP should serve other STAs in a way all the time. Note that during a CP, the AP will be always either a sender or a receiver, while the AP will be a sender or a receiver or a centralized moderator during a CFP. The first step for the collection of the channel status information is to request the channel measurement to STAs.

A new management frame is needed to be defined in order for the AP to request the measurement of other channels to a set of STAs associated with its BSS when it decided to initiate a channel selection. Which STAs the AP would request the channel measurement to will be again implementation-dependent. This request can be either of unicast, multicast, and broadcast. The management frame will specify (1) when to begin the measurement, (2) which channels to measure, (3) how long to measure, and (4) how to measure. How long to measure specifies how long the requested STA is allowed to be absent from the current channel for the channel measurements. How to measure a channel will be detailed in the next section in conjunction with the actual channel measurement process. During the time of a channel measurement of a STA, the AP must not transmit any frame to such a STA while buffering the frames to the STA. That is, the AP will consider this STA as a STA in a sleeping mode. The AP should not poll the STA during the CFPs if the STA is in the polling list.

2.3 Channel Measurement Process

The measurement of a channel will be in three forms: (1) detection of other BSSs, (2) measurement of *Received Signal Strength Indicator* (RSSI) and *Pakcet Error Rate* (PER), and (3) Carrier Sense / Clear Channel Assessment (CS/CCA) without RXSTART. The details are presented in the following subsections.

2.3.1 Detection of Other BSSs

For the purpose of other BSS detection, an existing MAC sublayer management entity (MLME) service, which is the "scan" service (pp. 100-103, [1]), can be used. This service is requested by the station management entity (SME) residing within each STA to the MLME via a management primitive

MLME-SCAN.request in order to request to detect existing BSSs in a number of channels. The primitive *MLME-SCAN.confirm* returns the scan results to the SME, including a complete description of all the BSSs found. While this service is originally defined in 802.11 in order for a STA to survey potential BSSs that the STA may later elect to try to join, we propose to use this service for a different purpose.

There are a number of primitive parameters for *MLME-SCAN.request*, which should be specified by the AP when a channel measurement is requested. Those include:

- ScanType: either active (the STA sends a probe frame and expects a response from a BSS) or passive (the STA simply listens to the channel, trying to detect some frames) scanning
- ProbeDelay: delay (in μs) to be used prior to transmitting a Probe frame during active scanning
- ChannelList: a list of channels to examine
- MinChannelTime: the minimum time to spend on each channel
- MaxChannelTime: the maximum time to spend on each channel

The management frame for the channel measurement request discussed in Section 2.2 should specify the values of all these parameters.

2.3.2 Measurement of RSSI and PER

Knowing whether there are existing BSSs in specific channels is not good enough in order to determine the best channel to run a BSS. In case of existing BSSs detected, knowing how close the STAs belonging to those BSSs is desirable while in case of no BSS detected, knowing the noise or interference level is desirable. When an 802.11 non-compliant system is up and running in a channel, the existence of such a system should be detectable not as a BSS, but as a co-channel interference. For example, an 802.11a STA will need to detect an ETSI BRAN H/2 STA running in a channel.

The 802.11 PHYs define a parameter named received signal strength indicator (RSSI), which ranges from 0 through RSSI maximum. This parameter is a measured by the PHY sublayer of the energy observed at the antenna used to receive the current PLCP Protocol Data Unit (PPDU). RSSI shall be measured during the reception of the PLCP preamble. The value of RSSI is reported to the local MAC entity as a parameter of the primitive PHY-RXSTART.indicate (RXVECTOR), which is an indication by the PHY sublayer to the local MAC entity that the PLCP has received a valid start frame delimiter (SFD) and PLCP Header. Based on this information, we expect to be able to use the RSSI in order to indicate how close the STAs of existing BSSs are from the channel measuring STA at least relatively.

However, there are two major problems with the current definition of RSSI:

1. Based on the current standard specification, RSSI is intended to be used in a relative manner even though it shall be a monotonically increasing function of the received power. This means that the RSSI value (out of 256 available values) as a function of the received power will be implementation-dependent. In order for the RSSI to be used as a measure of the interference level (from either existing 802.11 BSSs or other wireless systems), the function needs to be standardized.
2. The value of RSSI is reported to the MAC only when the PHY can receive the PPDU. That means, this can be used in conjunction with existing BSSs of 802.11, not with other systems, such as ETSI BRAN H/2 at 5 GHz channels. That is why we come up with the third form of the channel measurement.

When existing BSSs are detected, the packet error rate (PER) can be another good measurement to be used to determine the status of the channel. The value of PER alone may not be very useful since the PER can be high due to many different reasons including many frame collisions, and it will take a quite long time to measure the PER acurately. However, by being used in combination with other measurements such as RSSI and the third measurement described below, it may be a good information to consider even if it is measured during a relatively short time.

2.3.3 CS/CCA without RXSTART

If there exists an interfering non-802.11 device in a channel, the channel measuring STA will not be able to receive the signals from the device correctly, so the RSSI will not be report to the MAC. However, if the signal power from this device is high enough, the channel is indicated BUSY to the MAC via the PHY primitive PHY-CCA.indication (BUSY). Now, the measurement of the time portion when the channel stays busy without receiving any meaningful MAC frames (indicated by PHY-RXSTART.indicate) can be a good test to determine whether a non-802.11 device is up and running in a specific channel. For this, the nominal delay between PHY-CCA.indication (BUSY) and PHY-RXSTART.indicate should be considered in order to determine whether a CCA busy indication is from a frame reception or not. For this measurement, the AP just needs to specify how long the requested STA will spend on each channel, which is specified as part of the "scan" process already in section 2.3.1. One possible set of the measurement result is: (1) the number of CCA busy indications without receiving any meaningful MAC frame, and (2) the portion of the CCA busy time during the total measurement time. We may define a more complicated and sophisticated set of measurement results, such as a detected period of such CCA busy periods.

2.4 Measurement Report from STAs

Per the completion of a channel measurement, the STA, which was requested to measure the channel(s), should report the result to the AP. The result will include all three parts of the measurements described in the previous subsection. Those include (1) (a subset of) the parameters of *SCAN.confirm*, (2) the measured values of RSSI and PER for the channels, and (3) the measurement result of the CS/CCA without RXSTART. For channels in which no BSS was detected, only the third component will be valid since the first two components will not have any meaningful information without any existing BSS detected. This report may be transmitted upon being polled by the AP during a contention free period (CFP) or during the contention period (CP). A new management frame should be defined for this channel measurement report purpose.

2.5 Decision Making by AP

Per hearing back from STAs, the decision whether to move out of the current channel or not should be made by the AP while the rule is implementation-dependent. The decision will involve the three things: (1) whether to move or not, (2) to which channel per deciding to move, and (3) when to move. In order to determine to move or not, the AP will have to compare the status of other channels with that of the current channel in terms of what STAs experience. The moment of the channel switch may be affected by the status of sleeping STAs since all the STA within the BSS are desired to be informed the channel switch decision.

2.6 Channel Switch Announcement by AP

Once the AP determines to switch the channel, it must announce it to every STA in the BSS. It may transmit a broadcast frame several times indicating when and to which channel the STAs should jump. We may want to define a new management frame for this announcement, or adding this information into a beacon (by defining a new field in the beacon frame format) is another possibility. If a STA misses all these frames, which may happen due to many weird situations, it will be suddenly 'disconnected' from the AP after the AP move into the new channel. Then, the STA will have to re-associate with the AP by scanning all the channels. This channel switch announcement may require the acknowledgement from some STAs, especially, STAs with real-time isochronous connections. Since a service disruption of such connections is highly undesirable, ensuring the channel switch decision with such STAs is recommended. In this case, we need to define a new control frame for this kind of acknowledgement.

2.7 Switch into New Channel

The movement into a new channel should be as simple as changing the carrier frequency (or frequencies in case of 802.11a OFDM PHY). However, currently no such a service primitive is defined in 802.11 (except for in conjunction with Frequency Hopping (FH) PHY). Since we know that a number of such existing MLME primitives as MLME-SCAN, MLME-START, and MLME-JOIN involve with moving and running into a specific channel already, we propose to define a set of new MLME primitives for the channel switch, say, MLME-JUMP.request and MLME-JUMP.confirm, between MLME and SME. We expect that these new primitives can be implemented without any change in the existing PHYs. While the exact channel switch moment may be implementation-dependent, one possible moment could be right after a CFP, i.e., right after a CF-End frame, since in this manner, the service disruption time of the real-time isochronous connections may be minimized.

3 Summary

We proposed a new mechanism of dynamic channel selection (DCS) for IEEE 802.11 WLAN. This mechanism requires a number of new management (or control) frames while some of them may not be necessary. Those include:

- A frame for a STA to report the channel status and/or request a channel selection
- A frame for the AP to request the channel measurement to STA(s)
- A frame for a STA to report the channel measurement result
- A frame for the AP to announce the channel switch decision
- A frame for a STA to acknowledge a channel switch plan

In addition, the definition of some new MLME primitives for the channel switch was proposed. We also proposed some possible channel measurement mechanisms with a suggestion to the modification of RSSI value functions. The proposed DCS mechanism can be defined without requiring any change in the existing PHY specifications of 802.11. Note that in order for the DCS scheme to be used in practice, some implementation-dependent algorithms or rules should be supplemented on top of the proposed mechanism.

4 References

[1] IEEE, "Reference number ISO/IEC 8802-11:1999(E) IEEE Std 802.11, 1999 edition. International Standard [for] Information Technology-Telecommunications and information exchange between systems-Local and metropolitan area networks-Specific Requirements- Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications," 1999.

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